II. REMARKS

The Examiner has withdrawn, in part, the restriction/election requirement under 37 U.S.C §§ 121 and 372 so that the following claims, i.e., Group I (claims 1-4), have been examined, and only claims 5-8 except claims 1-4 as elected above have been withdrawn because they pertain to non-elected subject matter (Office Action, dated October 8, 2009, at p. 2, lines 1-2). Therefore, claims 1-4 have been examined.

With the above amendments, claims 1 and 3 have been amended.

Specifically, claim 1 has been amended to replace "a porosity of 90% or greater" with "a porosity of 95% or greater" as supported by original claim 1 and Example 1, in particular, p. 15, lines 23-26 of Applicants' original disclosure. Claim 3 has been amended to replace "an oxygen content falling within a range of from 1 to 13 wt.%" with "an oxygen content falling within a range of from 2 to 13 wt.%" as supported by original claim 3 and p. 10, lines 10-19 of Applicants' original disclosure. Claims 1 and 3 have been also amended to improve clarity.

The present amendment adds no new matter to the above-captioned applications.

A. The Invention

The present invention relates to a fiber-reinforced heat-resistant sound-absorbing material and a process for producing the material. Such material and process may be used for an exhaust nozzle of a jet engine or the like.

In accordance with an embodiment of the present invention, a fiber-reinforced heat-resistant sound-absorbing material is provided that includes elements recited in independent claim 1.

In accordance with another embodiment of the present invention, a process for producing a fiber-reinforced heat-resistant sound-absorbing material is provided that includes steps recited in independent claim 4.

Various other embodiments, in accordance with the present invention, are recited in the dependent claims.

An advantage provided by the various embodiments of the present invention is that a fiber-reinforced heat-resistant sound-absorbing material may be provided which remains undamaged for a long period of time even exposed to a high-temperature and high-speed exhaust gas of a jet engine or the like, has a sound absorbing performance in a wide frequency band which is a property necessary for the reduction of jet noise, and is light in weight.

B. The Rejections

Claims 1-4 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over JP 2001-010871 (a machine-generated English translation of the specification thereof, hereafter JP '871) in view of Oishi et al. (U.S. Patent No. 5,895,897, hereafter "Oishi '897") and Beall et al. (U.S. Patent No. 4,464,475, hereafter "Beall '475").

Applicants respectfully traverse the Examiner's rejections and request reconsideration of the above-captioned application for the following reasons.

C. Applicants' Arguments

A prima facie case of obviousness requires a showing that the scope and content of the prior art teaches each and every element of the claimed invention, and that the prior art provides some teaching, suggestion or motivation, or other legitimate reason, for combining the references in the manner claimed. KSR International Co. v. Teleflex Inc., 127 S.Ct. 1727, 11739-41 (2007); In re Oetiker, 24 U.S. P.G.2d 1443 (Fed. Cir. 1992).

In this case, the Examiner has failed to establish a prima facie case of obviousness against claims 1-4 because the combination of JP '871, Oishi '897 and Beall '475 fails to teach all of the limitations of the claims.

For example, the combination of JP '871, Oishi '897 and Beall '475 does not show or suggest the limitation of "wherein the fiber-reinforced heat-resistant sound-absorbing material has a porosity of 95% or greater" as recited in independent claim 1 as amended.

Furthermore, (1) the Examiner has failed to establish a legitimate reason to combine JP '871, Oishi '897 and Beall '475 to arrive Applicants' claimed invention and (2) the Examiner has failed to demonstrate that a person of ordinary skill in the art would have had a reasonable expectation of success of arriving at the claimed invention even if the modification was made. Thus, the rejections under §103 should be reconsidered and withdrawn.

i. JP '871

JP '871 relates to porous silicon carbide fiber which can be used as heat-resistant filters, such as an engine abandonment gas filter (JP '871, paragraph [0001]). A porous material as disclosed in JP '871, comprises silicon carbide fiber structure of which a density gravity is 0.05 – 1.0 g/cm^3, and an oxygen content is 1 wt.% or less (JP '871, paragraphs [0006], [0014]).

As admitted by the Examiner (Office Action, dated October 8, 2009, at p. 2, lines 15-18, and p. 3, lines 5-6), JP '871 not teach, or suggest, (i) "(a) a fiber preform made of silicon carbide short fibers having heat resistance of 1000°C or greater; and (b) a heat resistant compound having heat resistance of 1000°C or greater and applied onto the surface of said fibers, wherein the fiber-reinforced heat-resistant sound-absorbing material has a porosity of

95% or greater" as recited in claim 1, and (ii) "wherein the heat-resistant compound is a $BaO{\cdot}Al_2O_3{\cdot}SiO_2{\cdot}MgO$ oxide represented by $BaMg_2Al_6Si_9O_{30}$" as recited in claim 4.

In addition, JP '837 does not teach, or suggest, (iii) "wherein the silicon carbide fibers have an oxygen content falling within a range of from 2 to 13 wt.%" as recited in claim 3.

JP '871 teaches away from the subject matter recited in claim 3, i.e., an oxygen content falling within a range of from 2 to 13 wt.%, for the following reasons.

As described in paragraph [0014] of JP '871, a silicon carbide fiber structure of JP '871 forms a Webb in a density of 3.0 – 3.2 g/cm^3 and an oxygen content of 1 wt.% or less. If the density is less than 3.0 g/cm^3 and the oxygen content exceeds 1 wt.%, the weight loss by oxidation is produced at the time of sintering the silicon carbide fiber, which causes the size and the intensity of the Webb made of the silicon carbide fiber to change easily (JP '871, paragraph [0014]). By these facts, it is clear that one having ordinary skill in the art would not try to form a silicon carbide fiber Webb in an oxygen content of more than 1 wt.%, in particular, within a range of from 2 to 13 wt.% as claimed, because the above oxygen content results in undesirable changes in dimension and intensity of the silicon carbide fiber Webb. Therefore, one having ordinary skill in the art would instantly understand that the disclosure of JP '871 teaches away from "the oxygen content within a range of from 2 to 13 wt.%" as recited in claim 3.

ii. Oishi '897

Oishi '897 relates to a light-weight ceramic acoustic absorber, such as used for exhaust nozzles of a jet engine (Oishi '897, col. 1, lines 8-10). A light-weight ceramic acoustic absorber as disclosed in Oishi '897, comprises an alumina based ceramic with SiC whiskers, having a perforated body with a void ratio in the range of 80 to 92%, wherein there are voids with a mean diameter in the range of 50 to 450 μm near the front surface of the

body, and with a mean diameter in the range of 500 to 3,400 μm near the rear surface of the body (Oishi '897, Abstract and col. 6, lines 10-18).

Oishi '897 does not teach, or suggest, (i) "(a) a fiber preform made of silicon carbide short fibers having heat resistance of 1000°C or greater; and (b) a heat resistant compound having heat resistance of 1000°C or greater and applied onto the surface of said fibers, wherein the fiber-reinforced heat-resistant sound-absorbing material has a porosity of 95% or greater" as recited in claim 1, and (ii) "wherein the silicon carbide fibers have an oxygen content falling within a range of from 2 to 13 wt.%" as recited in claim 3.

According to a preferred embodiment of the present invention, fiber-reinforced heat-resistant sound-absorbing materials produced via a process of Example 1 have a porosity of 0.96 (i.e., 96%) for high bulk density product and 0.97 (i.e., 97%) for low bulk density product, respectively. These features are also recited by "a porosity of 95% or greater" in claim 1 (Example 1, in particular, p. 15, lines 23-26 of Applicants' original disclosure).

Such a feature is not disclosed or suggested by Oishi '897. Oishi '897 actually teaches away from the subject matter recited in claim 1, i.e., a porosity of 95% or greater. Specifically, Oishi '897 states, at col. 6, lines 25-30, as follows:

> "In an aspect of the present invention, voids are distributed with controlled diameters in accordance with the distance from the front and rear surfaces. However, if the void ratio is less than 80%, the absorber loses its light-weight characteristic, and if it exceeds 92%, the strength becomes undesirably low."

From the above passage of Oishi '897, it is clear that a light-weight ceramic acoustic absorber of Oishi '897 must have a perforated body with a void ratio in the range of 80 to 92%, in order to obtain a foamed ceramic, light in weight and highly resistant to thermal stress (Oishi '897, col. 2, lines 53-66). Thus, a person of ordinary skill in the art would promptly realize that Oishi '897 teaches away from "a fiber-reinforced heat-resistant sound-absorbing material having a porosity of 95% or greater" as recited in claim 1.

With respect to the limitation of claim 3, Oishi '897 does not disclose "an oxygen content falling within a range of from 2 to 13 wt.%" as recited in claim 3.

iii. Beall '475

Beall '475 relates to production of glass-ceramic bodies exhibiting high strength and capable of being used at temperatures of 1300 °C or higher (Beall '475, Abstract). A glass composition as disclosed in Beall '475, contains silicon carbide fibers and barium osumilite, wherein the glass composition is reinforced through the incorporation of silicon carbide fibers, and barium osumilite constituting a predominant crystal phase (Beall '475, col. 3, lines 21-33).

Beall '475 does not teach, or suggest, (i) "wherein the fiber-reinforced heat-resistant sound-absorbing material has a porosity of 95% or greater" as recited in claim 1, and (ii) "wherein the silicon carbide fibers have an oxygen content falling within a range of from 2 to 13 wt.%" as recited in claim 3.

There are no indications and/or teachings provided in Beall '475 regarding silicon carbide fibers having "a porosity of 95% or greater" as recited in claim 1 and "an oxygen content falling within a range of from 2 to 13 wt.%" as recited in claim 3.

iv. Summary of Arguments

The combination of JP '871, Oishi '897 and Beall '475 does not teach, or suggest, (i) "wherein the fiber-reinforced heat-resistant sound-absorbing material has a porosity of 95% or greater" as recited in claim 1, and (ii) ""wherein the silicon carbide fibers have an oxygen content falling within a range of from 2 to 13 wt.%" as recited in claim 3.

A proper rejection under Section 103 requires showing (1) that a person of ordinary skill in the art would have had a legitimate reason to attempt to make the composition or

device, or to carry out the claimed process, and (2) that the person of ordinary skill in the art would have had a reasonable expectation of success in doing so. PharmaStem Therapeutics, Inc. v. ViaCell, Inc., 491 F.3d 1342, 1360 (Fed. Cir. 2007). In this case, the Examiner has failed to demonstrate that a person of ordinary skill in the art would have had a legitimate reason to combine JP '871, Oishi '897 and Beall '475, and a reasonable expectation of success of arriving at Applicants' claimed invention even if the combination were made.

As discussed above, JP '871 and Oishi '897 teach away from the subject matter recited in claims 3 and 1, respectively.

Therefore, a person of ordinary skill in the art would have no reason to combine the references to arrive the Applicants' claimed invention. Even if the improper combination were made, a person of ordinary skill in the art would not have had a reasonable expectation of success of arriving at the Applicants' claimed invention, because, for example, there is no teaching, suggestion or other reason cited by the Examiner for a fiber-reinforced heat-resistant sound-absorbing material having a porosity of 95% or greater, as recited in claim 1.

For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against claims 1 and 3 of the above-captioned application. Claims 2-4 are all directly dependent from claim 1. Thus, the Examiner has also failed to establish a prima facie case of obviousness against claims 2-4 of the above-captioned application.

III. CONCLUSION

In view of the above amendments and arguments, Applicants respectfully assert that the Examiner has failed to establish a prima facie case of obviousness against Applicants' claimed invention.

For all of the above reasons, claims 1-4 are in condition for allowance, and a prompt notice of allowance is earnestly solicited.

The below-signed attorney for Applicants welcomes any questions.

Respectfully submitted,

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